special paper of the volume. The cases mentioned presented all the usual symptoms of sunstroke—high temperature, frequent and feeble pulse, stertorous respiration, unconsciousness, jactitation, convulsions, involuntary evacuations, &c. The first injection was used by Dr. Herbert Norris, in a case of apparently hopeless convulsions. These ceased at once, and soon after restlessness subsided, and the patient recovered. Three other instances of prompt recovery from severe symptoms under the same treatment are added. Of sixteen cases admitted into the hospital between June 20th and 28th, but four died. The hypodermic injections are not referred to in connection with them.

Dr. Hutchinson shows by a comparison of temperatures that all the cases of sunstroke did not occur on the very hottest days. On the 18th of July, when three cases were admitted, the maximum height of the thermometer was but 89.5° Fahr. He infers that there must probably be some other atmospheric condition in addition to heat which favours sunstroke. This view is undoubtedly correct. It is confirmed in a marked manner by the well known fact that sunstroke is, at like temperatures, infinitely more common in large cities than in the open country. Severe cases of heatstroke are rare among farm laborers, and common among those who are at work in towns, even in the shade.

The volume closes with a "Descriptive List of the Specimens added to the Hospital Museum during 1868," by Dr. W. PEPPER, Curator; and lastly, tabular statistics of the whole practice of the hospital for the year, with a brief summary of that of previous years.

We believe that few readers will hesitate to agree with us that this volume of Reports is one of the most interesting and instructive medical books recently issued. It is uncommonly readable, and well worthy of perusal.

H. H.

ART. XXI.—*The Old Vegetable Neurotics, Hemlock, Opium, Belladonna and Henbane; their Physiological Action and Therapeutical Use alone and in Combination; Being the Gulstonian Lectures of* 1868 *Extended, and Including a Complete Examination of the Active Constituents of Opium.* By JOHN HARLEY, M. D., Lond. F. R. C. P., F. L. S. Hon. Fellow of King's Coll. Lond.; late Asst. Phys. to King's Coll. Hosp.; Asst. Phys. to the Lond. Fever Hospital. 8vo. pp. 355. London, Macmillan and Co., 1869.

THOSE who hope that clinical medicine will be materially aided by experiment wisely pursued from the vantage ground of an improved and precise physiology will be greatly encouraged by this volume. Rational employment of the neurotics could not but wait upon the progress of definite analysis of nervous function: Dr. Harley has faithfully endeavoured to prevent it from falling far behind that progress. He has succeeded in developing many things of immediate value at the bedside, and has indicated the course which must be followed to discover more. Much might be said of his work as a model of severe scientific investigation. Conscious that the "study of the action of medicines is more difficult than any other, inasmuch as the conditions are more complex," he has patiently watched at each step to recognize and eliminate the agencies which would have modified and vitiated given results. The therapeutical conclusions, deduced with much apparent justness of reasoning, can receive the final verdict of clinical observation the more quickly in that their definiteness is only occasionally obscured by subtle speculation and vague suggestions. Close personal scrutiny of the pharmaceutical processes and subsequent detailed analysis of the various preparations enabled the author to avoid any possible error in relation to the drugs themselves; while the disturbances interposed by peculiarity of nervous constitution or idiosyncrasy, the conditions of health and disease, and every variety of external agencies, were destroyed so far as possible, by making a large number of observations upon a few subjects. The recorded experiments, many of them highly illustrative, upon the horse, dog, and mouse, were conducted by Dr. Harley from the intelligent standpoint of comparative physiology, and with a special view to the analytical power of different nervous systems. Thus, in the preface,

> "Observations on the lower animals have been as carefully noted as those on man, and my labours have in this respect been amply rewarded; for I find, generally, that for every variation in the effects of a particular drug on man, we may expect to see its exact counterpart in some one or other of the lower animals. It appears, indeed, that the effects which result from a given action depend, primarily, on the specific development of the nervous system: and secondarily, on individual peculiarity. Many and varied as the effects of the action of a particular medicine often are, they constitute but one connected series, the members of which are reciprocally complementary. It follows that carefully-observed experiments on the animal series will elicit the whole of the phenomena, which may result from the action of the same drug in different individuals of the human species. And in order, therefore, to obtain a *complete* view of these, we must subject the medicine to the analytical action of that variety of nervous system which characterizes the different species of animals." (p. v.)

We know not that this principle is elsewhere so well stated, and its recognition forms an important feature of the present work.

The first and most original portion of the volume is devoted to *conium.* Our available knowledge of this remedy has, up to the present time, been almost limited to its toxical effects. Pereira acknowledges and Christison laments the state of uncertainty with respect to its real physiological action in medicinal doses. Even in a work so recent as "Headland on the Action of Medicines," it is described as a "general sedative," while no other modern and approved treatise presents any definite indications or contra-indications for its use. This uncertainty has been largely due to the fact long suspected, and now proved by Dr. Harley's preliminary experiments, that the greater portion of the preparations of conium hitherto employed have been of very little energy, and in ordinary doses, absolutely inert. It was therefore necessary, as a first step, to analyze these critically and set aside all but one which should fairly represent the virtues of the drug. The odor of conia (readily developed by trituration with potassa and thus far regarded as a sufficient measure of value) is shown to be entirely unreliable since an exceedingly minute quantity of the alkaloid will produce pungent fumes which cannot be distinguished from those due to a larger amount.

> "This test is so readily applied, and appears at the same time so decisive, that any more elaborate analysis seems superfluous; and yet I venture to assert that no statement can be farther from the truth, no test more fallacious. *Half an ounce* of extract, containing but *a fraction of a grain* of conia, will, on tri-

turation with caustic potash, speedily evolve a powerful and penetrating odour of conia, and the effect is usually very much heightened by the simultaneous separation of a little ammonia." (p. 75.)

Nothing but the actual separation and measurement of the conia is decisive, and in accomplishing this the author avoided the destruction of a portion of the alkaloid which occurs during the usual process of distillation with potash. The small quantity of active principle obtained becomes more remarkable since the error of loss was thus prevented. He first treated the preparations with dilute sulphuric acid, then decomposed by means of potash, added ether to dissolve the liberated conia, and finally obtained the latter by gently evaporating the menstruum. The most important conclusions are as follows: Dried hemlock leaves do not possess the active properties commonly ascribed to them. It appears that when carefully prepared and preserved they retain a *trace* of conia; but it is equally certain that the quantity is much too small to furnish an efficient preparation. The active principle is to a large extent vapourizable even at the natural temperature of 70° Fahrenheit. The four preparations ordered by the U. S. Pharmacopœia being all made from the dried leaves, it follows that we must seek for others in order to obtain beneficial results from the administration of conium.

The solid extract, even when carefully prepared, appears to be practically useless. The present (British) Pharmacopœia (1867), directs it to be given in doses of from 2 to 6 grains. Now, granting that this preparation retains the whole of the active principle which, from an examination of the "succus," is placed at 1.4 grain in 100 grains, 6 grains of the extract would represent only the 0.084 of a grain of conia—a quantity insufficient to produce the effects of hemlock in a child two years old. This enables us to understand the statement of Dr. Pliny Earle (*Amer. Journ. of Med. Sc.*, p. 63, July, 1845), that from 45 to 100 grains of the extract were requisite to produce decided physiological effects in his own person.

Dr. Harley found that compared with the other parts of the plant the root contains only a small proportion of conia, and that in the careful preparation of an extract from its juice this small quantity is almost entirely lost. He obtained from the root three bodies, one resinous and two neutral, not previously described He called them rhizoconine, rhizoconylene and conamarine. They do not appear to possess any active poisonous properties.

The unripe fruit of the conium contains more conia than any other part of the plant, but it loses much when it becomes dry and hard. This change is analogous to that in the poppy-capsule. An efficient extract may be obtained from the green and nearly ripe fruits by means of alcohol, and the avoidance of a temperature above 160° Fahr. But the *tinctura conii fructûs* (Br. Phar.), prepared from dry fruits, is found to be medicinally inert. "The quantity of conia contained in f℥xx of the *t. c. f.*—assuming the fruit to be thoroughly exhausted of the alkaloid—would be 7½ grains = to 0.375 in f℥j. Now continental physicians prescribe conia in doses of $\frac{1}{16}$ of a grain for a child, and ¼ to 1 drop for an adult. Hence, f℥j of the tincture would be only a medium dose for an adult. The strength of the preparation cannot be conveniently increased, for the active principle, although freely soluble in dilute spirit, is in the fruit, effectually protected from its action by the horny albumen with which it is associated; a protection very inadequately removed by comminution.

The results thus obtained by chemical processes were proved correct by graduated administration in a long series of cases.

Having set aside the tinctures, solid and fluid extracts, the cataplasm, and preparations of the root, as having no value; and finding that conia, owing to its local irritant properties, should not be used subcutaneously nor by the stomach except in cases of necessity, we turn to the *succus conii* (Br. Ph.) as in all respects "a worthy representative of the famous hemlock," and that uniformly used by Dr. Harley. It is prepared by adding alcohol to the recently expressed juice of the fresh plant (1 volume to 3 of the juice). Set aside for seven days and filter. The *succus* does not deteriorate on keeping, and "in the compactness of the dose required, in the absence of any objectionable taste and odour, and in the potency and certainty of its operation, it leaves nothing to be desired." It may be prescribed alone or diluted with camphor water. The dose is thus described. "From two drachms to one ounce of the succus will, according to the motor activity of the individual, almost invariably produce the full physiological effect of hemlock, and the beneficial effects which may be expected to follow. I usually give a child six months old twenty or thirty drops; a child over two years old one drachm; one ten years old from one to two drachms. For a woman I prescribe two or three drachms; and for a man four or five drachms. From these initial doses I ascend until the peculiar effect of hemlock is declared. Having once attained this it is rarely necessary to increase the dose, for a dose which produces a given effect will, after six months' continuance of the medicine, usually continue to produce the same effect. Care must be taken in administering conium to patients possessed of but little bodily vigour. On the other hand, there are some persons whose activity is such that f℥x will be required to produce giddiness and muscular weakness." We now proceed to select such small portions from the extended records of experiment as may serve to render intelligible the subsequent conclusions.

The *first* effect of hemlock is a depression of the motor function; and its *last* is the complete obliteration of all muscular movement derived from the cerebro-spinal motor tract. If a strong, active individual take five or six drachms of the *succus* and start off for a long *walk*, he will be overtaken in the course of half or three-quarters of an hour with a feeling of general tiredness and a special weakness of the knees. There will be some giddiness and a feeling of heaviness over the eyes. There will be a sluggishness of adaptation of the eye. Vision will be good for fixed objects, but dim and hazy when an uneven object is seen to move. At first the general languor will be most oppressive, but it will soon become more tolerable; and if he should continue his journey for an hour, he will find that the fatigue has nearly passed off. In the course of another hour he will be as active as ever. Contrasted with the foregoing are the effects produced in a *period of rest*. "Three-quarters of an hour after the dose, on raising my eyes from the object upon which they had been fixed to a more distant one, the vision was confused, and a feeling of giddiness suddenly came over me. That these symptoms were due to impairment of power in the muscular apparatus employed in the adaptation of the eye was obvious; for so long as my eyes were fixed on a given object the giddiness disappeared, and the definition and capacity of vision for the minutest objects were unimpaired. * * * Within ten minutes of the appearance of this disorder of vision a general muscular lethargy affected me, and the eyelids felt as heavy as though they were depressed by the deepest drowsiness. * * * An hour and a quarter after taking the dose I first felt decided weakness in my legs." Fifteen minutes later "I was cold, pale, and tottering. There was positive diminution of voluntary power in every part of the muscular system, and this nearly amounted to complete paralysis so far as the hamstring and levator palpebræ muscles were concerned. * * * The mind remained perfectly clear and calm, and the brain active throughout. After continuing for about half an hour at their maximum the symptoms began rapidly to decline, and within three hours and a half of taking the dose they had totally disappeared. As a proof of this, I may mention that for the hour following the disappearance of the conium symptoms I was engaged in writing letters; I then walked briskly a distance of three miles, and finished the day's work by drawing a microscopic object."

A delicate young woman of inactive habits took four drachms of the succus. Twenty minutes afterwards she experienced nausea and giddiness. She dropped an inkstand which she was holding in her hand, and was unable to walk. These symptoms came on with alarming swiftness. In an hour there was nearly complete muscular paralysis; the eyelids were closed, pupils dilated, and the mind clear, calm, and active; she expressed herself quite comfortable. She tried perseveringly to raise the eyelids, but was quite unable to separate the margins. The pulse and respiration were normal, the surface warm. At the end of an hour, these symptoms had passed off; and after three hours, she had completely recovered her activity, and resumed her duties.

Such are the general and constant effects produced by hemlock, when administered in full medicinal doses. When the dose falls short of producing any of the above-mentioned symptoms while the individual is in a state of ordinary activity, we have absolutely no indications of its action. The earliest indications of the operation of the medicine are invariably those that arise from depression of the motor function of *the third pair of nerves.* They are giddiness and a sensation of a heavy weight depressing the eyelids, or actual ptosis. The pupil may or may not be dilated. The disturbance of vision is compatible with good definition for fixed objects. It is due to imperfect adjustment of the refracting media of the eye from partial paralysis of the ciliary branches of the third nerve. It is through these minute branches that the individual first becomes conscious of the effect of hemlock; and if he should be reading at the time, he will suddenly find the occupation fatiguing, and very soon impossible. He will be glad to close the eyes, and lie quietly as though asleep, yielding himself up to the increasing muscular lethargy. All the muscles supplied by the cranial motor nerves are more or less affected. *Double vision* occasionally occurs; *dilatation of the pupil* only after very large doses, and is often but slight. In the absence of irritation, functional or lesional, no particular influence upon the *spinal cord* can be recognized. Hemlock affects the motor function of this part of the nervous system last of all; and short of a poisonous dose, it does not interfere with its motor activity or reflex function in any appreciable degree. These views are very satisfactorily confirmed by experiments on the horse and mouse. When, however, there is a morbid excitability of the reflex function of the spinal cord, the influence of conium in subduing it is powerful and direct. Conium, then, in a state of health, and in the fullest medicinal doses that we can venture to give, exerts its power chiefly, if not exclusively, upon the motor centres within the cranium; and of these, the *corpora striata* are of course the parts principally affected. This appears to be indicated by the extreme rapidity with which the paralyzing influence radiates through the body. Excepting the reflex action of the cord the whole motor function of an individual under the full effect of conium is actually asleep. "It is to the corpora striata, to the smaller centres of motion, and to the whole of the motor tract precisely what opium is to the brain of a person readily influenced by its hypnotic action; and just as opium tranquillizes and refreshes the over-excited and weary brain, so does conium soothe and strengthen the unduly excited and exhausted centres of motor activity." *It is not a depressor of muscular vigor* but *a sedative to action,* and by repressing and removing irritative excitement of the motor centres becomes *indirectly* a *tonic* to these parts of the nervous system in cases which require its use. In the same way digitalis strengthens a weak heart by diminishing its beats and economizing force.

The effects of conium vary not with the *muscular strength* of an individual, but with his *motor activity.* Those leading a sedentary life are more readily influenced than those of active habits. A delicate active person will therefore require a larger dose than one with abundant strength and little energy. A restless child will often take with scarcely any appreciable effect, a dose sufficient to paralyze an adult of indolent habits. There is a corresponding difference among children themselves. In a little boy 1¾ years old, who began to walk while under treatment, it was necessary in order to produce equal physiological effect to give in a few days more than double the quantity he was taking before he began to walk without assistance.

Upon the cerebrum hemlock is powerless. It does not produce the least narcotic nor directly hypnotic effects. In reducing the motor centres to a state of perfect repose, hemlock predisposes the brain for sleep, brings it within its reach, so to speak, but there leaves it. There may be an *appearance* of sleep from the closed eyes and entire muscular quiet, while the brain is still alert.

The sensory part of the nervous system is altogether unaffected by the direct action of conium. Its anodyne power in certain diseases, as cancer, may be fairly attributed to muscular relaxation in the diseased parts rather than to a direct influence upon the sensory nerves; its influence being analogous to that of the knife in irritable ulcer of the sphincter muscle of the bowel.

The ganglionic system is equally independent of hemlock; the dilatation of the pupils arises from a depression of the centre of the third nerve, and not from a stimulant action of the sympathetic.

There is sometimes a transient emotional excitement of the circulation and respiratory movements upon the sudden accession of the conium effects, but they are not otherwise influenced, nor are the secretions or general nutrition directly modified. Dr. Harley has administered conium for months, in one case for more than six months, in such doses as *daily* produced its full results, and he invariably noticed an improvement in the general nutrition and vigor of the body.

What change conia undergoes in the economy is uncertain. The author has assured himself that it does not pass out of the body unaltered. It cannot be detected in either the breath, the sweat, the feces, or the urine. His modes of examination are original and conclusive.

The cases reported in illustration of the medicinal use of conium were treated by the drug alone, the condition of each patient being unaltered by any other means, medicinal or hygienic. Dr. Harley insists upon the following conclusion as an axiom: "That hemlock given in doses which fall far short of producing its proper physiological action is useless for the treatment of diseases to which it is adapted. * * * To give hemlock in doses that fail to produce an appreciable effect upon the motor system is to give repeatedly the hundredth of a grain of morphia to one dying from want of sleep, or a grain of quinine to cure an ague fit."

We must dissociate from conium "all notions of a deliriant, hypnotic, or convulsive action; all ideas of a sedative power over the heart, or of any influence upon the secretions. Its selection must depend upon the presence of irritation, direct or reflex, of the motor centres. If this exist, conium is the appropriate and hopeful remedy.

Dr. Harley regards conium as well adapted to children. He has treated with it eleven cases of *convulsion* occurring at or near the time of dentition and presenting great variety of degree and character. All recovered and the slightest cases very rapidly. Two of the most severe and confirmed cases are recorded at length. One of the most instructive secondary results was the restoration of power in the contracted and weakened muscles; an admirable illustration of the indirect tonic influence above described. In these very young children the general torpidity was produced as positively as in older persons, so that the little patients would lie quiet and motionless for a period varying from half an hour to two hours.

In *epilepsy* there is frequent indication for the use of conium, especially where the primary excitement is central; and the results are encouraging.

In *chorea*, where there is "an undue excitability of the motor centres, which throw off impressions so rapidly that the will is unable to control them," we appear to have a valuable remedy in hemlock. Five cases are reported. We cannot assent to the train of reasoning by which Dr. Harley attempts to demonstrate that the action of conium determines the non-existence of a co-ordinating centre of nerve force independent of the will. Conium could remove the motor irritation and cure the case, whether such centre is a reality or not. To *tetanus*, and many other spasmodic affections, conium is the natural antagonist. In a few cases of *cancer* the author has given hemlock a fair and prolonged trial. He finds that it has no effect in arresting the progress of the disease, but that it acts beneficially by preventing and mitigating pain (through relaxation); by improving the general health; and by enabling us to diminish the amount of opium usually employed.

We must close this portion of the subject with a condensed quotation in regard to *concussion of the spine.*

A healthy middle-aged gentleman dropped through an open trap-door into a cellar, and falling through a considerable space alighted upon his feet. He recovered from the immediate shock, but during the next twenty-four hours was troubled with incessant erections and profuse seminal discharges, the later ones stained with blood. He was restless and exhausted; legs weak and tremulous; pulse feeble, fast, and irregular. He was ordered suc. conii fʒiij, to be repeated at intervals of several hours, and kept at rest. This treatment was continued for six days. The emissions continued at intervals during the first day of the treatment, and then ceased. At the end of a week he was perfectly recovered, and remained in good health five months after the accident. "The foregoing case leads me to speak of the *influence of conium upon the* sexual organs. I have given it a full trial. In those cases of exhaustion and irritability which arise from early self-abuse; in those of troublesome irritation where the patient has been suddenly deprived of the legitimate means of gratifying his desires; and in those cases of erotic tendency that arise from obscure lumbar irritation, I have never known conium fail to give relief." It is very remarkable that while it possesses such a decided influence over the morbid conditions, it should be incapable of depressing the natural sexual function unless given in poisonous doses. This is contrary to the belief of the ancients.

Dr. Harley believes that great advantage is to be derived from the judicious combination of hemlock with opium. What is wanting in the one drug is complemented by the other, and together they form a most perfect combination for bringing repose to every part of the body: conium allaying the excitement of the motor centres, removing restlessness and agitation, which opium sometimes tends to induce or increase, and so fails to procure sleep. The use of large quantities of opium can be thus avoided, and the hypnotic effect secured when it would be otherwise quite impossible.

Without following the author into the details of his elaborate investigations concerning the opium alkaloids, we shall now briefly state the most important conclusions which he derives from them.

The action of *morphia* was studied in the horse, the dog, the mouse, and in man—and this, as also its companion alkaloids, were generally used subcutaneously.

In the horse the hypnotic effect of morphia is altogether superseded by its excitant action upon the cerebrum and motor centres. Restlessness and delirium are the prominent features. The two actions are distinct and antagonistic, and reappear in the case of the other animals but in different relative proportions. Morphia acts as a powerful stimulant to both the cerebro-spinal and sympathetic systems—the soporific effects resulting from its action upon the cerebral hemispheres; the excitant from excessive stimulation of the corpora striata and spinal cord. The vascular excitement is great. The pupil (horse) is commonly moderately dilated.

On the *mouse* the action of morphia is uniform and characteristic. It consists essentially in forced exercise associated and apparently dependent on a cramped condition of the spine. Hypnosis is altogether an after effect, and narcotism only occurs after a dangerous dose. "The motor centres are clearly under the influence of excitement, and yet it is equally apparent that the motor power is restrained and depressed; the muscles nearest to the cranio-spinal axis . . are affected with persistent cramp; while those most distant from it are flaccid and almost paralyzed.' It appears that the conductivity of the nerves is impaired." It is concluded that something (diminished conductivity) intervenes between the roots of the larger motor nerves and their ultimate ramifications to prevent the uniform diffusion of the cramping impressions which, originating in the excited centres of motion are expended upon the spinal and thoracic muscles. This view is strictly in accordance with the respiratory phenomena. A cramped, contracted, and at intervals fixed condition of the chest, is one of the earliest effects of the drug. The organs supplied by the pneumogastric appear to be equally cramped and depressed in function. Death occurs from apnœa; the pulmonary inaction secondarily congesting and crippling the heart which would otherwise be excited throughout. These facts enable us to understand those fearful symptoms which are sometimes the immediate result of the introduction of even a very small amount of the alkaloid beneath the human skin, and which have been erroneously referred to the direct entrance into a vein: the syncope, nausea, general distress, and death. Life is endangered by *spasmodic cramp of the respiratory muscles*, associated probably with a similar condition of the lungs themselves. The chest is fixed, the patient gasps for breath, the right heart becomes distended, and the pulse rapidly sinks until an inspiration momentarily restores the balance. The heart retains its vigor throughout (through stimulation of the sympathetic), and is depressed by the impediments in the lungs. Even after death the cardiac movements continue, and may be revived and maintained for half an hour by relieving the disturbed right cavities. The heart is in a constant state of *repression* whenever the excitant action upon the spinal cord is in the ascendant. The nervous systems of the horse and mouse show that physiologically morphia is a compound substance, and that its constituents are tetanus and hypnosis. If the hypnotic action were much weaker or altogether eliminated, as may perhaps occur in some animals, then, indeed morphia would not differ in its action from thebaia or strychnia.

In man and the dog there is less uniform preponderance of motor excitant action, but we find two classes of individuals, each of which is affected differently by opium. In the one class sleep is produced with ease, in the other with great difficulty; instead of it we find the distressing symptoms already described. Sleep comes only with a dangerous dose, or when the protracted effects of the drug have passed off from the exhausted body. Every practitioner is well aware of these general facts, but only those who have been taught by painful experience can realize the importance they assume when morphia is introduced beneath the skin.

In the horse opium dilates the pupil, in man contracts it, and in the dog produces scarcely any alteration. As the drug certainly stimulates both the cerebro-spinal and sympathetic systems, Dr. Harley explains these different effects by the varying relations of these systems to each other in the several animals. In the dog they are nearly balanced. We do not think the additional anatomical explanation which is suggested either consistent or satisfactory.

The author's observations upon *narceine* correspond closely to those of Dr. J. M. Da Costa.[1] He finds that it is a pure hypnotic, but so feeble that when taken into the stomach more than five grains are required to produce a slight tendency to sleep, and subcutaneously one grain is equivalent to only one-eighth of a grain of morphia. It tends strongly to produce hypodermic inflammation. Like morphia, it kills by depressing and ultimately paralyzing the respiratory muscles. It is eliminated by the kidneys, and if sufficient be administered by the skin, mechanical suppression of urine may result from the insolubility of the substance. The renal tubules of a mouse are depicted showing the narceine solidified and blocking up the calibre. Although absorbed into the blood it resumes its original insoluble state so soon as it passes the boundary line of vital action—the terminal extremities of the secreting tubes of the kidney.

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[1] Pennsylvania Hospital Reports, 1868, p. 177.

Meconine is found to be a feeble hypnotic, destitute of any disagreeable associated effects.

Cryptopia, the new alkaloid described by T. and H. Smith, of Edinburgh, in 1867, has, like morphia, two distinct effects, a hypnotic and an excitant of a most remarkable and exceptional kind, dependent partly upon an illusion of vision, and partly upon a tendency to convulsive action. The mental condition strongly resembles that in many cases of delirium tremens.

Codeia resembles morphia in its action, while *thebaia* appears to act almost exclusively on the motor centres, inducing that highest degree of excitement which results in cramp, and which is fatal to life because it arrests the respiratory movements.

Two effects, then, are observable in the action of opium, and these are traceable in various degrees of development in each of its constituents. Taken as a whole, these bodies form a natural series connected in the following order: morphia and its feeble associates meconine and narceine, cryptopia, codeia, and thebaia—the first and last member representing respectively, the highest development of hypnosis on the one hand, and convulsion on the other. But the one does not materially modify the action of the other, the preponderance of hypnosis or excitement being determined by the peculiarities of the nervous system acted upon; and, as we have already seen, hemlock is the proper adjuvant of morphia, neutralizing the motor agitation.

We must pass unnoticed the numerous pharmaceutical details of this section, as also very many additional physiological questions discussed at length. The views above stated, if confirmed by clinical observation, will certainly clear up much that is now confused in therapeutics. In the mean time, we forbear to interpose any theoretical objections.

We condense briefly the conclusions respecting *belladonna*, which are additional to those usually accepted by the profession. Sulphate of atropia was invariably employed in the experiments. All the observations upon the horse, dog, and man show it to be a powerful stimulant to the sympathetic nervous system, in other words, to the heart and bloodvessels. It is also a powerful, perhaps the most powerful, diuretic; causing an increase of the watery urine, and among the solid constituents, of the phosphates and sulphates more particularly. Large doses ultimately decrease the rapidity and force of the heart's action; but this arises from no special action on the vasculo-cardiac system, but from over-stimulation or exhaustion of the sympathetic nervous system. Dr. Harley does not find that belladonna has any considerable effect upon the spinal cord. The reflex activity may be *apparently* increased or diminished according to the condition of the voluntary control. He totally dissents from the view that the reflex action is diminished by contraction of the vessels of the pia mater, as also that the dilatation of the pupil is due to a similar condition of the vessels of the choroid. He maintains that the hollow viscera are relaxed under the influence of this drug; the circular fibres being under the control of the spinal cord and the longitudinal under that of the ganglionic system. Thus he explains the laxative effects upon the alimentary canal, the aid rendered in expelling calculi from ducts (the circular fibres being relaxed and the longitudinal tightened); and finally the beneficial action in cases of incontinence of urine from over-action of the contractile fibres whose stimulus comes through the spinal nerves. A full dose of atropia is invariably followed by an increase of urine but by great difficulty in voiding it.

Dr. Harley thinks it strange that the primary and essential result of the operation of belladonna, *vasculo-cardiac stimulation*, should have been so long overlooked. As a general diffusible stimulant it surpasses all other drugs, and it is a most appropriate and hopeful therapeutic means in all diseases where there is failure of the heart's action, *i. e.*, depression of the sympathetic nerve force. It must be borne in mind that an excessive dose will produce depression from over-stimulation. Given with a view of exciting or sustaining the heart's action, the dose (hypodermically) will range from the $\frac{1}{100}$ to the $\frac{1}{60}$ of a grain of atropia, and should never exceed the $\frac{1}{40}$.

The author thinks that belladonna will soon be acknowledged to have a sphere of usefulness coextensive with that of acute disease itself. Regarding sympathetic fever attendant upon local inflammation as a remedial effort, he proposes to aid it by administering atropia. Under the influence of the more general action he finds the local irritation and pain abate so soon as the hyperæmia is relieved; and the products of the inflammatory process are rapidly removed as the circulation through the part is freely established. We shall not comment upon this bold suggestion, but commit it to the test of bedside observation. Dr. Harley gives in illustration several cases of pneumonia, fever, and acute nephritis. In the disease last named much is to be hoped from the special diuretic influence in addition to the general effect just described. Tables representing very faithful analyses of the urine are appended. In chronic Bright's disease, while the degenerated tissue cannot of course be restored by this or any other medicine, the author finds a rapid diminution of albumen and increase of normal constituents in the urine, together with improvement of the whole system.

The question of the antidotal action of opium and belladonna is considered at great length. The recorded cases are carefully examined and classified in three tables. The analysis of these in connection with very many and varied experiments justifies the conclusions, that the evidence of antagonism is inconclusive; that belladonna has no influence whatever in accelerating recovery from the poisonous effects of opium; that the essential effects of opium are both intensified and prolonged by the concurrent action of belladonna, and that the latter is powerless to obviate the chief danger of opium-poisoning, the depression of the respiratory function. While belladonna is not an antidote to opium, but in large doses the exact reverse, it may, when the heart shows indications of failing power, be used in very small doses (gr. $\frac{1}{96}$ subcutaneously) as an aid to recovery.

The last chapter gives an interesting account of *hyoscyamus*. The received views concerning that drug are developed with fulness and precision.

We close the book feeling that there is very much in it claiming the immediate attention of therapeutists, and that it is unnecessary to anticipate by extended remarks at this time the practical criticism which their results will furnish. The knowledge of American medical literature apparent throughout the volume increases our confidence in Dr. Harley as a conscientious writer. The work is issued in the usual superior style of the publishers.

E. R.